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Abstract of the national paper of the Republic of Korea

I. Overview of recent domestic space activities

1. The Republic of Korea launched its space programme in the early 1990s, somewhat late compared with other developed countries. Currently, the Republic of Korea is operating four satellites: two of them are KOREASATs, geosynchronous orbit communication satellites, and the other two are KITSAT-series micro-satellites. In 1990, three more satellites will be launched, KOMPSAT-1, KOREASAT-3 and KITSAT-3. The national Mid-long Term Space Development Plan envisions the launching of 19 satellites by the year 2015, including 5 communication satellites, 7 multi-purpose satellites and 7 scientific satellites.

II. Space technology applications

A. Earth observation

2. Korea's satellite remote sensing technology is being used increasingly in the field of land development, environment monitoring and weather forecasting and has played a leading role in space development since 1980. There is a wide variety of satellite imagery now available and it is expected in the future to help the user community by linking the application and technical development in governmental research and individual software market activities.

3. The Korea Meteorological Administration, affiliated with the Ministry of Science and Technology, is operating a satellite office, which has sole responsibility for processing satellite data on pressure and temperature, which are provided to users with minimal delay. The current data receiving system for GMS-5 satellites and satellites of the National Oceanic and Atmospheric Administration of the United States of America will be backed up by FY-2b from China, GOMS from the Russian Federation and MTSAT from Japan.

4. Korea's first application of satellite data was an investigation of the geological and structural features of the Korean peninsula, which was related to the EROS programme of the National Aeronautics and Space Administration of the United States in 1972. In 1985, the Ministry of Science and Technology prepared a master plan for the establishment of domestic remote sensing technology. The plan pursued development in three major areas of remote sensing technology. The first area concerns applications of remote sensing technology, while the second involves receiving of remotely sensed data. The third concerns the processing of data by digital computers. In 1986, the Ministry of Science and Technology and many

government institutes conducted an experimental remote sensing programme to examine the applications of satellite data for their own fields. As regards the commercialization of satellite remote sensing, the Republic of Korea is still in the research stage. However, the Government will continuously support the research and technical development of satellite data analysis in environmental protection, disaster prediction, natural resource management and Geographic Information Systems (GIS), including imaging software. For the development of satellite remote sensing, the Republic of Korea is willing to cooperate with other Asian countries through joint research.

B. Satellite communication

5. KOREASAT, which is the Korean communication satellite programme, has opened new horizons for satellite broadcasting and communication on the Korean peninsula. The programme has made it possible to receive high-quality television signals at home by using 45 cm antennas. Some pockets inaccessible to television signals have been eliminated completely. The television signals extend into neighbouring areas, including the Democratic People's Republic of Korea and China.

6. The currently proposed mobile satellite communication system in the Republic of Korea will use low-Earth orbit (LEO) satellites under an altitude of 3,000 km. The advantages of LEO satellite communication are attributed to the low power loss in transmission between satellite and station and the small transmission delay, which make it a suitable candidate for voice transmission. Also, low launch costs, low rain attenuation and low multi-path are additional advantages derived from the LEO system.

7. Tele-education is another important application of satellite broadcasting and the Republic of Korea has witnessed its direct benefits. Since August 1997, the Education Broadcast System has been providing a one-way education service in the beam coverage area of KOREASAT using two digital DBS channels. Korea Telecom has been supplying industry education materials to the 562 telecommunication stations scattered throughout the nation and several consortia of universities have been delivering their academic courses via the KOREASAT communication link.

8. In 1999, the Electronics and Telecommunications Research Institute embarked on the development of new generation satellite-based distance education systems that perform valuable interactivity, such as on-line teaching, off-line multimedia learning, data carousels and video on demand.

9. Hundreds of television signals from many foreign communication satellite networks are being received in the Republic of Korea. The broadcasting services over neighbouring countries should be controlled based on the principle of national sovereignty. The Republic of Korea therefore points out that satellite television signal radiation should be coordinated by appropriate measures among the countries concerned.

C. Navigation and position location

10. Global Positioning Systems (GPS) open a new era of positioning and timing determination for modern civilization. Since the early 1990s, several Korean research institutes, universities and industries have been conducting GPS-related research. Differential GPS, receiver design, combined with GIS, and other GPS applications are their major topics of interest. It had been predicted that GPS-related industries, mostly car navigation, would be prosperous by around 1998. However, because of the current economic difficulties, many Asian countries, including the Republic of Korea, have fallen behind by at least two or three years in the quest to make this forecast a reality.

III. Space science

11. While most Korean people may not fully recognize the benefits of basic space science because of its short history, Korean scientists working in space science-related fields participate actively in the global effort for the peaceful uses of the space environment. Specific topics in space science research include the origin of the universe, the near-Earth environment, monitoring of near-Earth objects and new celestial objects, and space exploration. The Korea Astronomy Observatory, the only government-affiliated institute in the field of space science, plays a major role in the study of the origin of the universe by operating a 1.8-m optical telescope and a 16-m radio telescope. To extend the scope of research, a 5-m class optical telescope and very long baseline interferometer projects are in the planning phase. In research on the near-Earth environment, basic data about space plasma around the Earth and the physics of the upper atmosphere are of special interest because of their practical applications for space development. Sharing the data collected from the near-Earth environment with the international community will be one of the important contributions made by Korean space development. Astronomers in Korea are also extremely interested in near-Earth objects in conjunction with sky survey projects for finding new celestial objects and trying to develop local stations to search for near-Earth objects and to participate in the global network in the future.

IV. Geographic Information Systems

12. A plan for a nationwide "information super-highway" has been developed in the Republic of Korea in order to promote the public use of GIS and other information services, and a national GIS project, which covers technical development, standardization, a national base map and land information and management, has been in progress since 1995. Large-scale national thematic maps have also been prepared on the basis of remote sensing data.

V. Small satellite missions

13. The Satellite Technology Research Center at the Korea Advanced Institute of Science and Technology has been developing micro-satellites for scientific and engineering purposes since 1989. The first micro-satellite, KITSAT-1, with a mass of 50 kg, was launched in August 1992 on the Ariane-IV launcher. The main objective of the KITSAT-1 programme was the acquisition of satellite technology through manpower training. After the success of the KITSAT-1 programme, it took less than one year to develop the next micro-satellite, KITSAT-2, also with a mass of 50 kg, which was launched in September 1993 by Ariane-IV. It is planned to launch the third micro-satellite, KITSAT-3, with a mass of 100 kg, in May 1999. The KITSAT-3 imaging system will provide 15-m ground resolution multi-spectral images. The fourth micro-satellite, KITSAT-4, is currently in the initial development phase. Payloads will be developed through international cooperation.

VI. International cooperation

14. As space applications become more and more dedicated to promoting human welfare, the scale of international cooperation has increased in proportion. This trend is due to the fact that space development is now no longer an activity traditionally limited to a few leading countries, but rather an essential element in the improvement of the quality of human life all

over the world. With the rapid accumulation of satellite technology and the resulting expansion in Korea's space programme, a wide range of international cooperative activities are being implemented by the Republic of Korea and other countries at the regional and global levels. The areas of cooperation include space and Earth science study, satellite manufacturing, satellite communication and remote sensing.